REMARKS

Claims 17-21, 23-29, 31-32 and 34-36 are pending. Claims 23-27 have been withdrawn from consideration. Claims 1-16, 22, 30 and 33 have been previously cancelled. Claims 17-21, 28-29, 31-32 and 34-36 are rejected. Independent claims 17, 28, 31 and 34 are amended. Support for the amendments can be found throughout the application, for instance in the specification and claims as originally filed. No new matter is added. Applicants respectfully request reconsideration and withdrawal of all rejections.

Claim Rejections - 35 U.S.C. §102

Claims 17-21, 28-29, 31-32 and 34-36 is rejected under 35 USC §102(b) as being anticipated by GB 2,064,676 to Morgan. It is alleged that Morgan teaches each and every element of the claimed invention.

Applicants respectfully disagree. The present invention as set forth in claim 17 concerns a method of producing a hydrodynamic type porous oil-impregnated bearing comprising a porous bearing body being formed with bearing surface on an inner peripheral surface thereof, said bearing surface having inclined hydrodynamic pressure generating grooves, and oil retained in pores of said bearing body by impregnation of lubricating oil or lubricating grease, said method comprising the steps of: inserting a forming pattern in an inner peripheral surface of a cylindrical porous blank, said forming pattern having a first forming portion for forming a region of said hydrodynamic pressure generating grooves and a second forming portion for forming the other region in said bearing surface, applying a compacting pressure to said porous blank to press the inner

peripheral surface of said porous blank against said forming pattern, thereby simultaneously forming the region of said hydrodynamic pressure generating grooves and the other region in said bearing surface on the inner peripheral surface of said porous blank, and after forming said bearing surface, removing said compacting pressure so as to utilize the spring-back of said porous blank in releasing said forming pattern from the inner peripheral surface of said porous blank.

The present invention as set forth in claim 28 concerns a method of producing a hydrodynamic porous oil-impregnated bearing comprising a porous bearing body being formed with a bearing surface on an inner peripheral surface thereof, said bearing surface having a plurality of inclined hydrodynamic pressure generating grooves, and oil retained in pores of said bearing body by impregnation of lubricating oil or lubricating grease, said method comprising the steps of: inserting a forming pattern in an inner peripheral surface of a cylindrical porous blank, said porous blank being made of a sintered metal, said forming pattern having a forming portion for forming said hydrodynamic pressure generating grooves, said forming portion being composed of a plurality of convex portions each of which agrees with each of said hydrodynamic pressure generating grooves, applying a compacting pressure to said porous blank to press the inner peripheral surface of said porous blank against said forming portion of said forming pattern, thereby forming said hydrodynamic pressure generating grooves in the inner peripheral surface of said porous blank, and after forming said hydrodynamic pressure generating grooves, removing said compacting pressure so as to utilize the spring-back of said porous blank in releasing said forming pattern from the inner peripheral surface of said porous blank.

The present invention as set forth in claim 31 concerns a method of producing a porous bearing body of a hydrodynamic type porous oil-impregnated bearing, said porous bearing body being formed with bearing surface on an inner peripheral surface thereof, said bearing surface having a plurality of inclined hydrodynamic pressure generating grooves, said method comprising the steps of: inserting a forming pattern in an inner peripheral surface of a cylindrical porous blank, said porous blank being made of a sintered metal, said forming pattern having a forming portion for forming said hydrodynamic pressure generating grooves, said forming portion being composed of a plurality of convex portions each of which agrees with each of said hydrodynamic press generating grooves, applying a compacting pressure to said porous blank to press the inner peripheral surface of said porous blank against said forming portion of said forming pattern, thereby forming said hydrodynamic pressure generating grooves in the inner peripheral surface of said porous blank, and after forming said hydrodynamic pressure generating grooves, removing said compacting pressure so as to utilize the spring-back of said porous blank in releasing said forming pattern from the inner peripheral surface of said porous blank.

The present invention as set forth in claim 34 concerns a method of producing a hydrodynamic porous oil-impregnated bearing, a porous bearing body of which is formed with bearing surface on an inner peripheral surface thereof, said bearing surface having inclined hydrodynamic pressure generating grooves, said method comprising the steps of: inserting a forming pattern in an inner peripheral surface of a porous blank, said forming pattern having a forming portion for forming said hydrodynamic pressure generating grooves, said forming portion comprising a plurality of convex portions, each

of which agrees with each of said hydrodynamic pressure generating grooves, pressing said forming portion of said forming pattern against said inner peripheral surface of said porous blank, thereby making plastic deformation of said inner peripheral surface of said porous blank occur to form said hydrodynamic pressure generating grooves, and after forming said hydrodynamic pressure generating grooves, removing said compacting pressure so as to utilize the spring-back of said porous blank in releasing said forming pattern from the inner peripheral surface of said porous blank.

In contrast, Morgan discloses oil impregnated sintered porous bearings and their production. See page 3, lines 1-33; Figures 1, 2, 3 and 4. Morgan discloses that alternating troughs and ridges circumferentially spaced around the inner bearing surface are produced by providing alternating troughs and ridges on the core rod of the coining and/or forming tools. See page 2, lines 18-24. Morgan also discloses that in the coining/forming action, some of the porous metal will undergo more plastic deformation and higher stress than another portion of porous metal. See page 5, lines 32-35. Accordingly, upon removal of the sizing core rod, those areas which have been subjected to the higher stress spring back more than those areas which have been subjected to lower stress. See page 5, line 35-37.

Applicants therefore submit that no invention as claimed is taught or suggested in the prior art including Morgan. As explained in the Response dated May 5, 2003, in the claimed invention, the spring back of the porous blank is utilized so as to release the forming pattern from the inner peripheral surface of the porous blank. As a result, the forming pattern can be released without breaking the grooves that are formed on the inner surface of the blank. In contrast, Morgan merely discloses that metal areas

subjected to stress will spring back. Morgan does not teach or suggest that such spring back can be utilized in order to release a forming pattern. Moreover, Morgan contains no teaching or suggestion with respect to the problem of releasing a forming pattern without breaking grooves. Therefore, Morgan simply recognizes the phenomena of spring back rather than teaching or suggesting that such spring back can be utilized in a method, as claimed, to release a forming pattern and avoid the breaking of grooves.

In fact, it is pointed out that independent claims 17, 28, 31 and 34 are amended herein to more clearly set forth this aspect of the claimed invention, in contrast to Morgan. Applicants note that the amendment only clarifies the existing claims, and does not present anything new for consideration. Therefore, in that Morgan fails to teach or suggest each and every element of the claimed invention, Applicants urge withdrawal of all rejections.

In addition, Applicants wish to address the Japanese reference JP 2-107705 ("JP 705"), which has been cited in the examination of the corresponding Japanese application, and now included in the Information Disclosure Statement ("IDS") attached hereto. As shown in Figure 2, JP 705 discloses the method for forming a large diameter part 11a at the middle in the axial direction of the inner peripheral surface of a sintered body 4, along with the sizing core 11 for forming the large diameter part 11a, metallic mold 15 and upper and lower punches 12, 13. The method of JP 705 includes the steps of: a) setting the sizing core 11 (inserting the large diameter part 11a) in the mold 15, see Figure 2A, b) pressing the sintered body 4 into the gap between the sizing core 11 and the mold 15, see Figure 2B), c) pressing the sintered body 4 by the upper and lower punches 12 and 13 for applying a compacting pressure to the sintered body 4,

see Figure 2C, and d) knocking out the sintered body 4 so as to utilize spring-back of the sintered body 4 in releasing the sizing core 11 from the inner periphery of the sintered body 4.

Applicants wish to point out that JP 705, alone or in combination with Morgan, fails to teach or suggest the claimed invention. In JP 705, the inner peripheral surface of the sintered body 4 formed by the sizing core 11 has two bearing surfaces at the both sides of the large diameter part. However, the bearing surfaces have no grooves. Thus, JP 705 discloses merely the large diameter middle part between bearing surfaces without grooves, and not a method for forming a bearing surface with hydrodynamic pressure generating grooves. Moreover, it is pointed out that the large diameter middle part of the sintered body 4 has a larger diameter than the bearing surface so as to recede from an outer peripheral surface of a shaft to be inserted therein, so that it does not need high accuracy in dimension and shape as a bearing surface. Accordingly, those of ordinary skill in the art viewing JP 705 would find no teaching or suggestion regarding any method concerning forming a bearing surface with hydrodynamic pressure generating grooves, as claimed. Furthermore, in Morgan, the troughs in the bearing surface extend parallel to the longitudinal axis, and corresponding to that, the core is formed with a plurality of circumferential alternating troughs and ridges extending parallel to the longitudinal axis. Thus, in Morgan, spring-back is not necessary for releasing the core from the inner periphery of the sintered compact. Applicants therefore submit that those of ordinary skill in the art, reviewing the JP 705 and Morgan references, would have no motivation to combine reference disclosures, in a misguided

attempt to arrive at the claimed invention. Again, Applicants urge that the prior art fails to teach or suggest the claimed invention, and all rejections should be withdrawn.

In view of the amendments and remarks above, Applicants submit that this application is in condition for allowance and request favorable action thereon.

In the event this paper is not timely filed, Applicants hereby petition for an appropriate extension of time. The fee for this extension may be charged to our Deposit Account No. 01-2300, along with any other additional fees, which may be required with respect to this paper referencing Attorney Docket No. 100725-00047.

Respectfully submitted,
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Enclosure: Information Disclosure Statement